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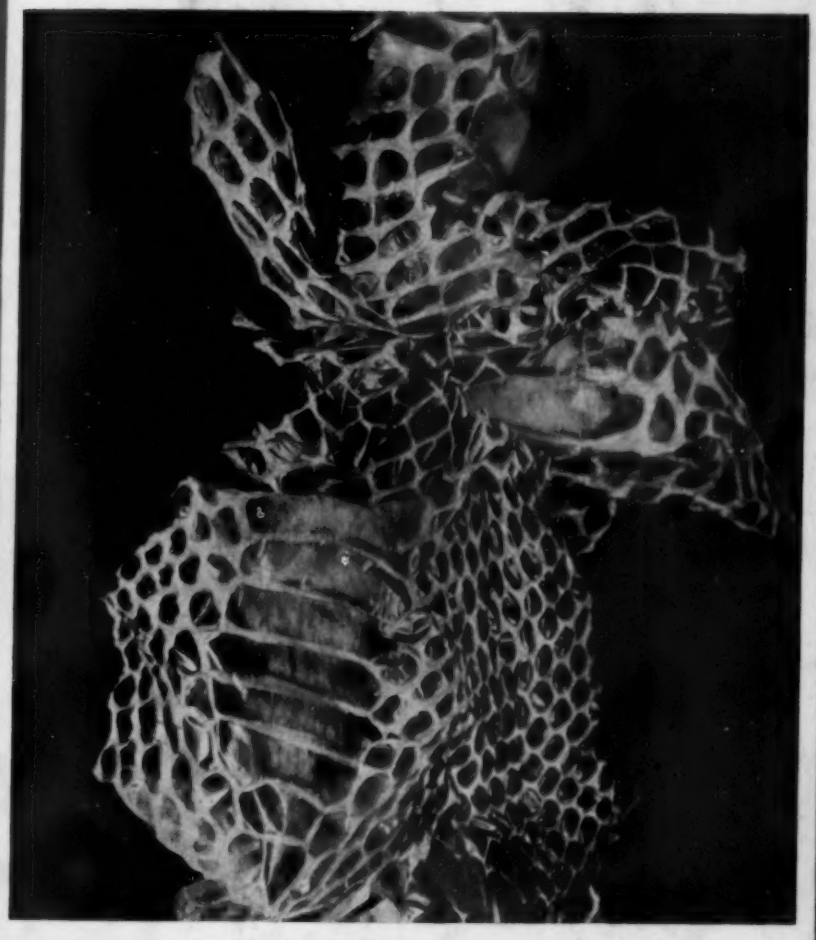
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



MARCH 13, 1937

Cast-Off Garments

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A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

Vol. XXXI *No. 831*

The Weekly Summary of

Current Science

Published Every Saturday by

SCIENCE SERVICE

2101 Constitution Avenue

Washington, D. C.

THE INSTITUTION FOR THE POPULARIZATION OF SCIENCE organized 1921 as a non-profit corporation, with trustees nominated by the National Academy of Sciences, the National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate and the journalistic profession.

Edited by WATSON DAVIS

Subscription rates—$5.00 a year postpaid; two years $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

Canadian subscribers please add 50 cents a year, foreign subscribers 75 cents a year to regular subscription rate to cover postage.

Members of the American Association for the Advancement of Science have the privilege of subscribing to SCIENCE NEWS LETTER at the reduced price of $3 per year. Application for this privilege should be accompanied by privilege card obtained from the Permanent Secretary, A.A.A.S., Smithsonian Institution Building, Washington, D. C.

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Cable address: Scienserve, Washington.

Entered as second class matter at the post-office at Washington, D. C., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices.

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DO YOU KNOW?

Emeralds owe their green color to chromium.

Eggs of the sea shrimp are so tiny that 24 of them could rest on a pin head.

A coconut grove has been planted on Oahu Island, Hawaii, to honor George Washington.

A list of 4,400 ancient monuments that have state protection in Great Britain has been prepared.

In the past half million years, the basic design of teeth in man has not changed, says a British dentist-anthropologist.

A speed record for road building in China was set when a 50 mile stretch in Hupeh province was finished in less than a month.

Along the Tigris River, Turkish farmers raise watermelons so large that 100 pounds is not unusual, and melons weighing 150 pounds have been reported.

Typewriter ribbons can be made of synthetic textiles.

A tunnel under the Euphrates River was constructed by the ancient Babylonians.

A European hypnotist has reported success in hypnotizing a chimpanzee in the London zoo.

When eggs in winter have thin shells, this is because the hens were fed a ration short in minerals or Vitamin D.

Pneumonia was a disease that afflicted ancient Egyptians, it was learned from evidence in the lung of an Egyptian mummy.

The musk-ox has no tail for fly-swatting purposes, but the musk glands provide a protection against mosquitoes and flies.

Naturalists are puzzled at finding seeds of the tropical papaya in the stomach of a Wisconsin duck, killed in autumn when such birds are flying south.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

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ZOOLOGY

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ANTHROPOLOGY

Your Ancestors—500,000 B.C. Scientists Probe Man's Origin

Homo Sapiens' Start Probably in Old World—Experts Agree That Americas Were Then "No Man's Land"

By EMILY C. DAVIS

HAVE you any mental picture of your great-great-repeated a few thousand times grandfather, who lived, say, half a million years ago?

What a help the old gentleman would be to modern scientists, if he could come back to earth for a day!

For our Stone Age ancestors and distant connections are to be a center of scientific attention this month. Eminent anthropologists have come thousands of miles from China, Africa, European countries, to meet with American scientists in Philadelphia next week. And for what? To lay on the table, so to speak, all their combined knowledge, all the evidence ever dug up in patient endeavor to show what the oldest men on earth were like.

Imagine your great-great-etc., grandfather wrapped in his best fur robe, favorite axe in hand, stalking into that international gathering. Even if he talked only in grunts and had nothing to say for publication, he would teach eager, observant scientists more about the Old Stone Age than they can learn in a century of digging.

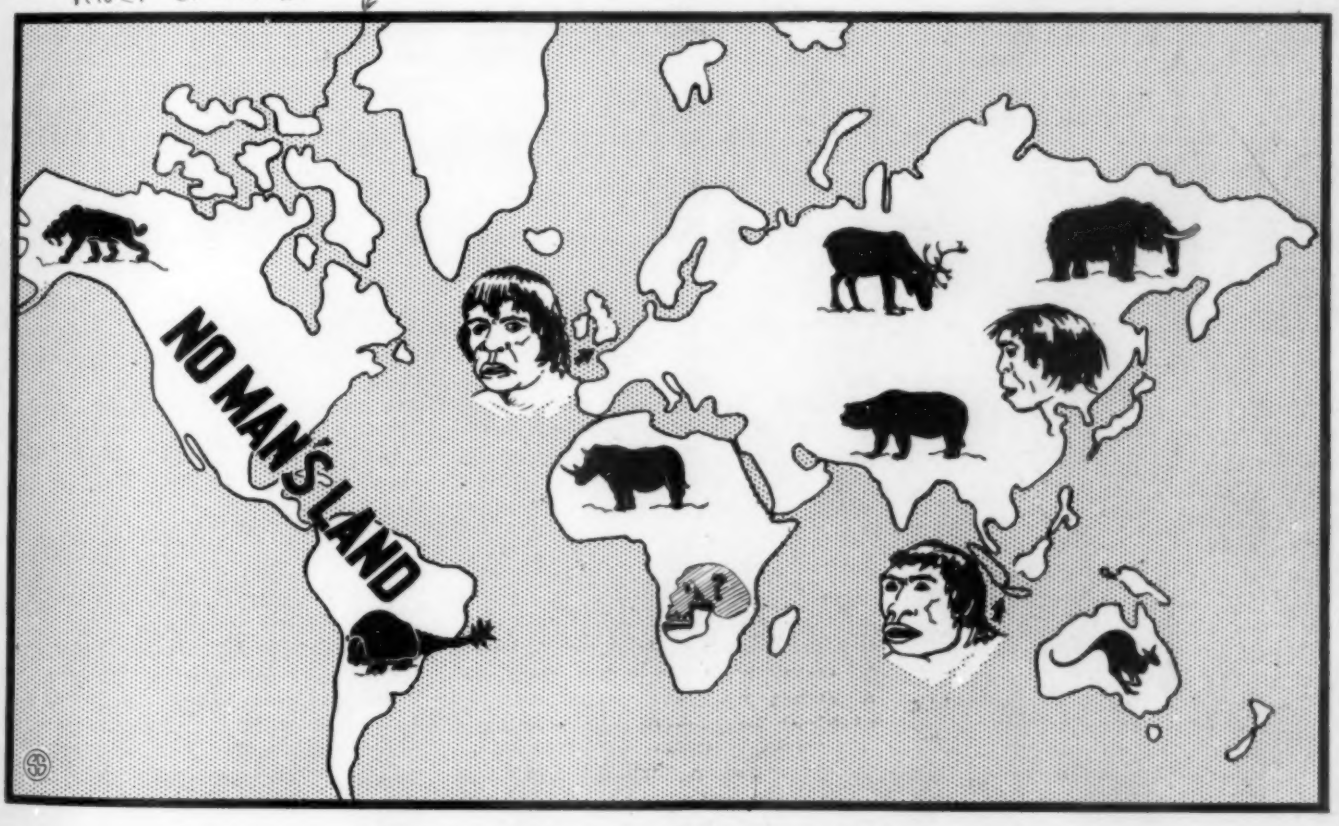
That's impossible and fantastic, of course.

As the next best thing, scientists are bringing to the meeting some of the treasured fragments of man's early existence, and casts of other rare and famous remains.

The occasion for this International Symposium on Early Man is the 125th anniversary of the founding of the Academy of Natural Sciences of Philadelphia.

When the Academy was started in 1812, science was dimly beginning to glimpse rediscovery of a strange lost age of men with uncouth manners and tools shaped of stone. Archbishop Ussher was still a popular authority on the age of the earth, with his decision for Bible history that the world was created in the year 4004 B.C. But there had already been discoveries that foreshadowed an upheaval of this dating. It was the mid-nineteenth century, however, before fossil bones of the Old Stone Age were found and recognized as remote and extinct races of man.

Now, important clues are unearthed and given wide publicity, every year.



EARLIEST MEN—HALF MILLION YEARS AGO?

Java is prehistorically famous as home of Pithecanthropus erectus. A late verdict says Java Man is just a big ape, and this may call for a new portrait, to replace the one shown. A cave in China is being probed for more and more skeletons of Peking Man. England's Piltdown Man, as shown, is sometimes put in this class of antiquity, but there is many an argument over that. Kanam Man from Africa is just a jawbone with some teeth. There is too little of him to permit a likeness, but what there is arouses violent scientific debate. He may be a direct ancestor of modern man. The animals shown are contemporary with early man.

Hundreds of scientists are working to assemble man's scattered past.

The hardest problem is to get every possible bit of meaning out of a jawbone from an African site, a skull cap from English gravel, or bones of two dozen individuals from a Chinese cave.

An international conference offers a rare chance for experts to talk together, and iron out differences of opinion.

Experimental Men

Discoveries show plainly that Nature long ago produced a number of experimental types of mankind. Only the species called *Homo sapiens,* meaning wise or intelligent man, has survived.

We are probably not looking at a direct ancestor, when we stare curiously at a restoration bust of one of the most famous experimental man-creatures, such as the Piltdown dawn man, found in England, or Peking Man, China's oldest known inhabitant.

Heidelberg Man, known only by a brutish jaw, is another of the discarded experiments. As for Java Man, or Pithecanthropus, most noted of all the ancients, the latest pronouncement on him is that he was probably not a man after all, but an ape—a superior sort of gibbon. He lived in trees, walked on all fours part of the time, at least, and while his brain was bigger than that of any known ape, yet this ancient specimen did not talk or think man-fashion. This verdict by Prof. Eugene Dubois may, if generally accepted, remove old Pithecanthropus from the gallery of prehistoric notables, entirely.

To look at the oldest recognized direct ancestor of modern man, you have to be content with observing the jaw of Kanam Man, found in Africa by a British scientist, Dr. J. S. B. Leakey. And, at that, you may keep mental reservations about relationship to this fossil, because not all scientists agree with Dr. Leakey's verdict that this Kanam Man is directly ancestral to *Homo sapiens* and at the same time half a million years old.

When dates are quoted at more than 10,000 years or so back, America is conspicuously left out of the argument. Not a trace of a dawn man or woman has ever been found on these shores.

The leading candidate for title of earliest known American is Minnesota Man. Twenty thousand years are as much as Prof. A. E. Jenks of the University of Minnesota claims for the antiquity of this skeleton, which makes the New World seem new indeed, by anthropological standards.

LARGEST PORTABLE TELESCOPE

A telescope's location, as well as its size, is important. Cornell takes pride in the world's largest portable telescope, whose 24-inch diameter mirror is shown above. William T. Thomas, retired Ithaca business man, who spent months grinding its delicate surface, is inspecting his handiwork. No single part of the completed telescope will weigh more than 20 pounds.

ANTHROPOLOGY

Peking Man's Own Jaws Argue His Primitiveness

PEKING Man's own jaws argue in favor of his position as one of the most primitive of all human types—perhaps even the most primitive. Evidence based on the study of eleven fragmentary Sinanthropus jawbones is presented by Dr. Franz Weidenreich of Peiping Union Medical College in a special publication of the National Geological Survey of China.

Dr. Weidenreich compares the Peking jaws in a number of respects with the jawbones of modern Chinese on the one hand and with the jawbones of several primitive human races, and of anthropoid apes, on the other. In practically every point studied—general massiveness, size and shape of teeth, angle between the halves of the jaw, and so on—Peking Man, though still undoubtedly human, shows more simian characters in his jaw than other human beings. Sinanthropus was as little like the modern Chinese as can well be imagined.

Particular contrasts between Peking Man and the modern Chinese are found at opposite ends of the jaw. At the back, the part of the jaw that rises to hinge against the skull is almost vertical in Peking Man—a decidedly gorilla-like character. In modern Chinese there is a very pronounced backslope—an angle of 125 degrees, instead of almost 90 degrees as in the ancient jaws.

Even more pronounced is the contrast in the matter of chins. Peking Man simply had no chin at all; his jaw curved sharply back from the base of his front teeth. With this receding chin and an equally receding brow, Peking Man must have had just about as rugged-looking a face as a round Chinese teapot. In strong contrast with this is the sharply-jutting chin that adorns the modern Chinese jawbone. It might be summed up by saying that Peking Man had a powerful jaw and an exceedingly weak chin, while the modern Chinese has a jaw of only moderate strength but a rather well developed chin.

PHYSICS

Paraffin Lenses Concentrate Neutrons as Glass Does Light

Discovery by California's Dr. G. N. Lewis Promises Aid to Cancer Treatment—Neutron's Nature Queried

PRELIMINARY tests indicating that neutron beams can be concentrated by use of paraffin lenses have been reported to the American Physical Society by Prof. Gilbert N. Lewis of the University of California.

Prof. Lewis' announcement, appearing in the *Physical Review* (March 1) in collaboration with Philip W. Schutz, will be of the greatest importance to physical, chemical and medical radiation research if confirmed independently in other laboratories.

Importance of the announcement lies in the fact that neutrons are the latest and in many ways the most effective "bullets" with which scientists probe the nuclear cores of atoms and learn new knowledge of this hidden physical world. Moreover, it has recently been found that neutrons are much more efficient in creating ionization in living tissues than are X-rays or gamma rays from radium. Thus the possibility of using neutron beams for treating cancer has been a motive behind much of the recent research.

If Prof. Lewis' findings, that use of a paraffin lens will gather and collect neutrons and can increase the concentration of these non-electrical particles in a beam, turns out to be correct, then laboratories throughout the world will take up the technique used.

"Howitzers" Used

More and more potent beams of neutrons are being sought in all laboratories for their researches. Either "howitzers" of paraffin are used which contain a mixture of beryllium and radium, or else giant accelerating apparatus like the cyclotron is employed for creating neutrons. The high price of radium handicaps many scientists in pursuing neutron research. The large accelerating apparatus, too, is costly. Concentrating neutron beams with lenses of paraffin thus would be a major aid to research, for weak sources could be used with an effectiveness now attainable only in a few favored laboratories.

Prof. Lewis is, perhaps, best known for his theory of atomic structure in chemistry which proved most fruitful in interpreting valence of atoms. Prof. Irving Langmuir, Nobel prize winner, later extended Prof. Lewis' atomic theory and every textbook in chemistry today discusses the famous Lewis-Langmuir atom.

Present evidence reported by Prof. Lewis and Mr. Schutz indicates that neutrons are bent, or refracted, as they pass through paraffin. Although neutrons are considered to be of a particle or corpuscular nature the new finding cannot be interpreted by present theory, points out Prof. Lewis, saying:

"We have been unable to conceive of any purely corpuscular explanation of this remarkable phenomenon."

Waves With Neutrons

If it is assumed, however, that each neutron is accompanied by a train of waves, an interpretation consistent with the facts appears possible which is closely akin to the phenomenon of refracting, or bending by the passage through the paraffin.

"This view at once suggests," state the University of California investigators, "the use of a paraffin lens for the focusing of neutron beams. Preliminary experiments have been made which strongly indicate the existence of such focusing."

The process of concentrating radiation or particles has been one which has the utmost significance to the advance of scientific research.

The discovery that prisms of glass and other materials could bend light rays and split a beam into a spectrum led to the invention of the spectroscope, which has been called the most useful of all physical instruments in its power of analysis. The bending ability of materials also finds wide application in the use of light-concentrating lenses in microscopes, spectacles, telescopes and other optical equipment.

The concentration of charged atomic particles like electrons and protons is accomplished by the use of magnetic and electric fields and is used in television equipment, as only one example.

Neutrons, being of a non-charged particle nature, have never been found to be affected by electric or magnetic fields. Prof. Lewis' present work is the first indication that their path is bent by passage through prisms of paraffin.

Science News Letter, March 13, 1937

SEISMOLOGY

Seek Quake Information From Persons in Area

FIRST-HAND information about the effects of the March 2 earthquake in the Midwest, as observed by persons who actually experienced it, is being sought by seismologists.

All persons who felt the earthquake or have seen any of its effects are invited to mail a brief statement to The Jesuit Seismological Association, St. Louis University, St. Louis, Mo. The information will be transmitted to the U.S. Coast and Geodetic Survey in Washington, D. C., and to university earthquake observatories the country over.

Most desired is information about kind and extent of damage caused by the earthquake. Photographs showing details will be welcomed. The seismologists also wish to know, for each town or farm community, approximately what percentage of the people felt the tremors. Time and duration of the shake, for each locality, are specially important points. Where accurate notes were not taken, estimates are helpful.

Some manifestations of an earthquake that would attract attention in the shaken region are: objects upset, plaster or chimneys cracked, snow sliding off the roof and icicles crashing from the eaves, cracking of ice on frozen ponds and creeks, change of water level in wells, or of rate of flow in springs, etc.

It is desirable, if photographs are sent, that the compass direction in which the camera was pointed be indicated.

It was not possible to obtain an exact epicenter of the shock.

Best determination was that the quake occurred in southwestern Ohio somewhere near the boundaries of Ohio, Kentucky and Indiana. The shock was classed as a "weak" one but is much stronger than the much-publicized shock that occurred during the recent Ohio River floods.

Science News Letter, March 13, 1937

The hide on the neck of a Canadian wood bison may be fully an inch thick.

ARCHAEOLOGY

A Saint's Book

Book of Kells, Famous Medieval Irish Manuscript Volume, Studied by American Architect for Possible Restoration

By DR. FRANK THONE

IRELAND gave the world much, in the ages that men call Dark. Flung far to one side of the track of the great tribal migrations that broke the Roman Empire in the West, double-moated against the trampling of barbarian invasions, the people of the Happy Island were able to keep alive a high and rich culture, with its own art and literature, laws and settled ways of life. Saint Patrick, who bore the light of Christian Rome even from the southern fringe of settlements in Munster to the King's House of Ulster in the North, found no such dark pagan shadows as missionaries had to fight in other North European lands. People and nobles alike heard him gladly, and the new faith and learning found transplantation and blending easy with the old art and culture.

For long, while the rest of Western Europe weltered in the anarchy of wild tribes that finally were half-tamed by the spiritual authority of Rome into the beginnings of order we know as feudalism, Ireland "lay in a patch of peace like a dog in a patch of sun." Beautiful things were wrought in gold and silver, stone and leather, by Irish artists and artisans.

Security For Scholars

Sheltered in the great Irish monasteries, scholarly monks (many of them from lands as far away as Byzantium) were producing books whose few surviving battered, fragmentary copies are still the wonders of the world. Done on costly vellum, carefully lettered in permanent inks, the capital letters and page borders illuminated in bewilderingly intricate tracery and pictures of saints done in rainbow colors, bound in gold and studded with jewels, one of these ancient Irish holy books was a whole treasury in itself. Nothing was counted too much or too good to lavish on the sacred texts. The scribe's whole life, the best gems of the King's own crown, were spent without stopping to reckon them up at all.

Acknowledged king above all other ancient Irish books was the Book of Kells. Even now in its old age, this thousand-year-old volume rates as a marvel of skill and beauty. To earlier men it even seemed there must have been supernatural inspiration for its workmanship. A writer in the twelfth century was told that it was the result of direct angelic intervention, and was ready to believe the tale. Even in the chillier light of the sixteenth century, after the Irish monasteries had been systematically expropriated and robbed for the benefit of Henry VIII and his "deserving Tudor" followers, one Gerald Plunkett of Dublin, who had possession of the Book for a time, made note: "This worke doth passe all mens conynge that now doth live in any place. I doubt not there . . . anything but that ye writer hath obtained God's grace."

A Thousand Years Old

Just what is this Book of Kells, that has made such a stir in the world?

It is a book of the Gospels and certain other religious writings, done on thick sheets of vellum by unknown scribes over a thousand years ago, and kept for many generations in the ancient town of Kells, in County Meath, not far from Dublin. Kells was once the residence of Columcille, who was a great bishop and a great saint, and might have been a great ruler in Ireland as well, had he not elected to leave the world for the Church. Hence the Book is sometimes mentioned as belonging to Columcille.

In its present state, the Book of Kells has 339 leaves. It originally had more, but of course part of them were lost during the vicissitudes of the centuries. Some twenty of its pages are magnificently illuminated—covered all over with the intricate polychrome scrollwork that only Irish artists could trace, some of them enshrining saints' portraits done in the formalized, somewhat stiff style of the times. Originally the Book of Kells had a gem-studded gold cover; and that is what began its troubles. It was not yet two centuries old when that magnificent binding caused it to fall among thieves. In the Chronicles of Ulster, the year 1006 A.D. is noted by the following paragraph:

"The large Gospel of St. Columcille . . . in its cover of gold studded with precious stones . . . the chief relic of the Western World, was stolen from the Greater Church at Kells, and found, after the lapse of some months, concealed under some sods, destitute of its gold-covered binding."

Yet even in its despoiled state, the Book continued to be a wonder of the world; for it was nearly two centuries later that Giraldus Cambrensis wrote his elaborate praise of the "angelic" workmanship of a marvelous manuscript he had seen at Kildare, which many modern scholars feel quite sure was the Book of Kells.

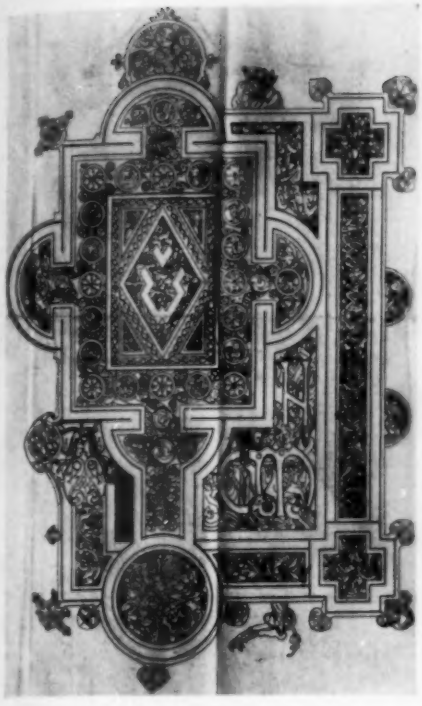
In Troubled Times

The Book appears definitely in documentary history—and in trouble—when the agents of Henry VIII seized the monastery at Kells. It is listed among the effects of the closed establishment by the last abbot, Richard Plunkett, under date of Nov. 18, 1539. It appears to have remained in private hands, including those of a presumable relative of the abbot's, Gerald Plunkett, for about 40 years.

By then the sober and scholarly James I was on the throne. He commissioned the noted Bishop Ussher to seek out and purchase notable documents and manuscripts bearing on church history in Great Britain and Ireland. (This Bishop Ussher, by the way, is the same one whose Bible dates are still printed in the margins of the King James version of the Bible and are often defended as part of the sacred text itself by literalist believers.) The bishop discharged his commission well, acquiring among other things this Grail of all manuscripts, the Book of Kells. An entry in his handwriting shows that he had got possession of it, and had counted the leaves (then 344 in number) on August 24, 1621.

Within five years after the death of Bishop Ussher, in 1661, a part of his collection was transferred to the library of Trinity College, Dublin. With it came the much-adventured Book of Kells; and it has remained there, Trinity's chief literary treasure, for the past 276 years.

Yet even so its troubles were not over. Early in the nineteenth century some librarian with more of a sense of



"FORASMUCH AS"

The famous* Quoniam *page from the Book of Kells; the beginning of the Gospel according to Saint Luke.

mechanical neatness than of the real values of things decided to have the Book properly rebound. So all the old irregular edges of the pages were trimmed off nice and even—and many of the fabulously beautiful border illuminations were ruthlessly shorn off and mutilated in the process. (One is left wondering when the Dark Ages really were: a thousand years ago, when the book was written, or a hundred years ago, when an "educated" university officer could calmly commit such a stupid piece of vandalism!)

And now comes a new man, an American of Celtic background, much interested in the contributions the Western Island has made to our common civilization and still more interested in what forgotten treasures further search may turn up. He is Dr. John Carroll Broderick, architect, now resident in California. He wants to do his bit for the great Book of Kells. He has already studied the notable old manuscript in Dublin, making many preliminary sketches and examinations, and now he has an ambitious plan and program which he hopes to put through.

It is nothing less than the complete rehabilitation of the great Book, and the placing of some 250 copies of it in the leading libraries of the world.

Dr. Broderick, however, has no notions of further profanation of the original manuscript itself. Enough well-meaning harm has already been done in that direction, he thinks. He wants to turn his architect-artist's skill to the careful copying of the elaborate illuminated pages and borders, using inks as like those of a thousand years ago as he can make or obtain. He wants to restore, from other Latin texts, the lost pages and passages, and to complete the gaps left in places by the original scribes themselves.

Another line of study which Dr. Broderick hopes to pursue with the Book of Kells is an examination with ultraviolet and infrared light, to see whether there are any traces of an older writing under the existing lines. This was often done with ancient manuscripts, because the vellum on which they were written was so expensive. The older writing was erased and the new written over it. Such a twice-written manuscript is known to scientists as a "palimpsest." Was the Book of Kells written originally on virgin vellum, or is it a palimpsest? That is something which the "invisible light" of modern science may help to clarify.

"The Doubtful Page"

Dr. Broderick's studies have already brought out one or two hitherto unsuspected facts about the Book, and corrected one or two erroneous assumptions of long standing. For example, the saint depicted on one illuminated page has long been so much a subject of dispute that the page has achieved the traditional name of "the doubtful page." Dr. Broderick called attention to two eagles, drawn on opposite sides of the seated figure's head. These, in Biblical symbolism, are the mark of St. John the Evangelist, as the lion is of St. Mark, the calf is of St. Luke, and an angel is of St. Matthew. This discovery seems to leave no doubt that the picture is meant to represent St. John, though the saint's dark beard does not fit in with the modern conventional notion of a smooth-cheeked young Apostle in the Johannine role. It is worthy of note, however, that despite his dark beard, St. John's hair, even here, is shown as long and blond.

Dr. Broderick's identification of the saint on the "doubtful page" as John set up a new dilemma. For there was a figure on another page that had long been thought to be an image of the fourth evangelist. Dr. Broderick pointed out, however, that in view of the four-times-repeated motif of the Cross, and other symbolism in the surrounding

ST. JOHN WITH A BEARD

Long called the "doubtful page" because of dispute regarding the identity of the portrait. But the four eagles belong to Saint John, Dr. Broderick pointed out.

design, that this picture was intended to represent Christ himself. The Dublin scholars are inclined to accept his interpretation of these two figures.

Architectural background is evident in some of the outlines of the page "foundations" copied by Dr. Broderick. With the intricate curves and scrolls left off, the designs might almost serve as ground plans for churches.

A beautiful example of this architectural style of drawing is to be found in the elaborately illuminated first page of the Gospel according to St. Luke, as studied by Dr. Broderick. The whole page is taken up with the first word of the Gospel, "Quoniam," which is rendered in English versions as "Forasmuch as." Here the Q takes up most of the page, a great, square-sided letter so filled with scrollwork that it looks like a church window. Within the Q is a V-shaped U and an O that looks more like a W. The rest of the letters, at lower right, are more recognizable as parts of the alphabet, though they are combined and intertwined with a crowd of human figures and faces. Figuring out and explaining a diagram like this gives architectural knowledge a real opportunity.

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PHYSIOLOGY

Brain Waves Do Not Vary With Day-to-Day Moods

BRAIN waves are consistent. Moods and mental activity and accomplishment may vary from day to day, but not the wavy lines on paper that tell scientists about the electrical energy that accompanies activity within man's brain.

The day-to-day consistency of a person's brain waves is reported by Drs. Lee Edward Travis and Abraham Gottlober of the State University of Iowa to *Science* (Feb. 26). These brain-probing scientists recently reported that one person can be distinguished from others by his brain waves.

Brain waves vary according to whether a person is sleeping or awake and working at mental problems or awake and just sitting idly with nearly "blank" mind. The latter condition is the one on which the Iowa scientists made their studies. Brain wave records taken day after day from the same person were so consistent that they could be identified as belonging to that person just as different samples from one record could be identified in the earlier studies. Presumably the same consistency will be found in a person's brain waves during sleep or mental activity.

Science News Letter, March 13, 1937

CRYPTOGRAPHY

American Black Chamber Documents Are Studied

THE secret writings of the embryo American Black Chamber—vintage 1776—have now come to light through the aid of chemistry and photography. And with the aid of a puzzling curiosity by Dr. L. Bendikson of the Henry E. Huntington Library at San Marino, California.

In the *Franco-American Quarterly*, published by the Yale University Press, Dr. Bendikson reveals his laboratory detective work to make visible the messages in secret ink which American agents in France, in the 18th century, sent to John Jay, first chief justice of the United States.

Sir James Jay, brother of John and an English physician, also wrote to his American brother with secret ink and, in fact, his formula for the ink was the one which the American used.

Technique of the writing, reports Dr. Bendikson, was to send a short, harmless breezy note to some person in America and then fill all the remaining blank space on the large sheet of paper with the invisible writing.

George D. van Arsdale, chemical engineer of Pasadena, discovered the 18th century secret ink formula and found that the agent in France wrote with tannic acid and that John Jay sponged the letters with ferrous sulphate. No process of fixing the invisible writing was used so that, with time, the writing turns blank again. The only external evidence was that the paper appeared to have been washed in some chemical.

Four letters were studied. Three addressed to John Jay and one written by him. Dr. Bendikson was able to reveal the contents of one letter by the use of ultraviolet photographs. Another letter, when exposed to ultraviolet radiations, assumed a deep purple color, obscuring altogether what little was otherwise perceptible of the hidden message. Dr. Bendikson then took recourse to the opposite end of the spectrum, the infra-red region, and found, after a period of experimentation, that the best legible plates could be obtained by photography with oblique illumination, consisting of visible red and near infra-red rays.

Dr. Bendikson in deciphering a message in one letter which had been marked out with a pen, first made an enlarged photostat of the message. Then he examined the scratched lines, portion by portion, under the microscope. Here the difference between the strokes of the original writing and the heavier "staccato" strokes of the superimposed marks was emphasized. He was thus able to eliminate the latter on the photostat, leaving revealed the original message.

Science News Letter, March 13, 1937

GEOLOGY

New Island Suddenly Arises in Black Sea

A NEW island suddenly popped up in the Black Sea recently, off the southwest coast of the Crimea. It is about 800 feet long and 35 feet wide, and its crest stands about 20 feet above sea level.

A commission of the Academy of Sciences of the USSR investigated the curious phenomenon. They found that a huge mass of rock from an undercut cliff had suddenly dropped to the sea floor, throwing the bottom into wave-like folds. The new island is the emersed part of one of these folds. Whether it will survive, or slowly sink into the sea again, geologists are at present unable to predict.

Science News Letter, March 13, 1937

IN SCIEN

ASTRONOMY

New Comet Visible In Western Sky

A NEW comet just visible to the naked eye in the western sky after sunset has engaged the attention of astronomers.

Astronomer A. Wilk of Poland discovered the new heavenly object Feb. 27 and Harvard verified its existence. It was eighth magnitude, was near the star known as "55 Piscium" when discovered, and was moving north about one degree a day. It will grow fainter, not more brilliant.

Science News Letter, March 13, 1937

ZOOLOGY

Coyotes Chew Fittings Off Ranger's Ski Poles

CHAMPIONSHIP honors for hard-luck ski stories are claimed for a ranger of the National Park Service, on winter station up toward the northeast corner of Yellowstone National Park.

The ranger recently set about refitting two pairs of extra-fine ski poles. He wound them with rawhide, put on new points, washers, and loops. They were ski poles any man might be proud to sport at Lake Placid, or even in the Alps themselves. Finally he painted and stained them, and set them on the porch of his house to dry.

Next morning the ski poles were gone. Nothing was in sight but coyote tracks leading away from the house in all directions, and a few drag-marks left by the poles as the thieving little wolves carried them off.

Two hours' research resulted in the recovery of three of the poles. The fourth never has been found.

But what those coyotes had done to the new-furbished ski poles was plenty. They had stripped off every scrap of rawhide, loops, washers, and all, leaving nothing but the bare wood of the poles—and even that they had chewed in spots. A whole day's hard handwork gone down the gullets of a gang of hungry thieves!

The ranger hasn't cooled off yet.

Science News Letter, March 13, 1937

ENE FIELDS

ENGINEERING

Mineral Plays Role of Boy Who Stuck Finger in Dike

SCIENTIFIC mineral counterpart of the legendary Dutch boy who stuck his finger in the dike and saved the Netherlands from disaster, was described at the meeting of the American Institute of Mining and Metallurgical Engineers. Engineers are already using the mineral to seal dams and the walls of reservoirs and the possibilities of use in levees along the Mississippi and Ohio Rivers cannot be disregarded.

The sealing mineral is known as bentonite, a form of clay, which has the curious property of absorbing from three to seven times its volume of water and expanding more than six times its original volume.

Oliver Bowles, U.S. Bureau of Mines, and chairman of the Institute's Industrial Minerals Division, told how a soupy mud is made of bentonite and forced, under pressure, into sand or gravel beds.

The slurry, as the engineers call it, coats the grains of sand or gravel, fills the spaces between them and makes the whole mass water-tight even under high pressure. When drying occurs the bentonite shrinks and clings tightly to the sand or gravel. But as soon as leakage occurs the bentonite takes up the water, swells again and reseals the entire mass.

Science News Letter, March 13, 1937

ENGINEERING

Windmills Return to Keep Pipe Lines From Corrosion

AS THE shiny net of great power transmission lines grew throughout the country the doom of the windmill as a means of power for the farmer was forecast. Internal combustion engines providing a small power plant also served as an added menace.

But windmills are not dead in America and throughout Texas and adjoining states they have returned in ever increasing numbers. Their function? To protect the vast pipe line networks from corrosion.

Under the catchy title of "Gone With the Windmill" the Industrial Bulletin of Arthur D. Little, Inc., points out this month that the windmill's return is in the form of motive power for electric generators and that pipe line corrosion is now being combatted, with considerable success, by this wind-generated electricity.

While it may sound fantastic to a layman, here is how it works out. Buried steel or iron pipe lines frequently pass through moist ground where the conditions for a certain type of corrosion are ideal. Little electrical circuits are set up between the pipe and the surrounding soil and even small electric currents will carry ions of iron away. It is estimated, for example, that a one-ampere current flowing for one year will remove some 20 pounds of steel. The trouble is that the current flows from the pipe to the soil. Change the direction of this flow of current and you should be able to stop this type of damage, known to the scientists as electrolytic corrosion.

With such a change of current, ions would still flow but they would come toward the pipe rather than away from it and they would consist of hydrogen gas that would form a protective coating on the pipe at the previous point of danger.

It is to create this auxiliary current, reversing nature's kind, that brings in pipe line windmills. Only a very low voltage current is needed and with fairly steady winds found in the oil regions of the Southwest the operation of the windmills is reasonably certain. Thus the almost obsolete windmill is again becoming a familiar mark on the landscape.

Science News Letter, March 13, 1937

ENTOMOLOGY

Black Widow Gets Long Train Ride

BIG, hairy tropical spiders that ride as stowaways in bunches of bananas are not the only members of their tribe able to travel in that way. Dr. Dayton Stoner of the New York State Museum, tells in *Science* (Feb. 26) of a black widow that rode from California to Albany, N. Y., in a bunch of grapes. She was found by a youth named Richard Tortorice, who took her to the Museum. She lived there for more than a year.

Science News Letter, March 13, 1937

PUBLIC HEALTH

Denmark Vaccinates For Whooping Cough

DENMARK has begun to vaccinate all its children against whooping cough, hoping to add this disease to smallpox and diphtheria as ills from which little children need not die.

This news was brought to America by Dr. Thorvald Madsen, director of the Serum Institute, Copenhagen, and president of the Health Section of the League of Nations.

Whooping cough is the most serious disease of children in Denmark. It ranks ahead of diphtheria and scarlet fever. In a group of 1,000 unvaccinated children this disease killed 26. In a group of 3,900 vaccinated, there were only 6 deaths. Such figures have convinced Danish health authorities of the desirability of vaccination. The vaccine will be given as early as possible in cases of whooping cough which may develop. It has been found to lessen the severity and shorten the course of the disease.

Science News Letter, March 13, 1937

PHOTOGRAPHY-SPORT

Camera Accurate in Clocking Finishes of Horse Races

IF YOU like to put down two dollars once in a while, you can have faith in so-called "camera finishes" where the results are determined photographically. An expert at the National Bureau of Standards (expert in science; not in horseracing) has just approved installations of cameras at race tracks as being accurate and reliable.

At the request of the New York State Racing Commission, Dr. Irvine C. Gardner made a study of the optics of the instruments and checked through the fairly simple requirements of installation which would provide true findings. Need for the study arose because some sports newspaper writers had been questioning the method.

Dr. Gardner found that with simple precautions the camera would be satisfactory and in all installations he examined, these precautions had been considered adequately.

"In other words," says Dr. Gardner, "the camera will tell you who won the race *after* the race is over, but I suspect some of these fellows are looking for a camera to tell them who won the race *before* it starts."

Science News Letter, March 13, 1937

GENERAL SCIENCE

Science Does Not Make War But Peace and "Good Life"

SCIENCE, instead of promoting war, actually holds the key to the ultimate solution of the problem of peace, Dr. C. C. Furnas, Yale professor of chemical engineering and author of "The Next Hundred Years," told the American Institute of New York City in a recent address.

"It takes a long time view to believe this," he explained, "but it is true even if slow."

Some feel that science is merely an instrument of suicide because of its contribution to the deadliness of war, he said. The mob-stirring abilities of super-nationalistic maniacs does not seem to him to be dependent in any way upon the effectiveness of science. They can act more quickly than they used to but they will be eliminated more quickly too.

"Modern war with its destructive potentialities is no more destructive of life than the old-fashioned kind—with its attendant pestilence," Dr. Furnas continued. "The Thirty Years War with the crudest of weapons succeeded in laying waste to northern Europe and directly causing the death of between eight and twelve million persons, more through starvation and pestilence than combat. A race bent on suicide will turn the trick if it has to resort entirely to stone axes.

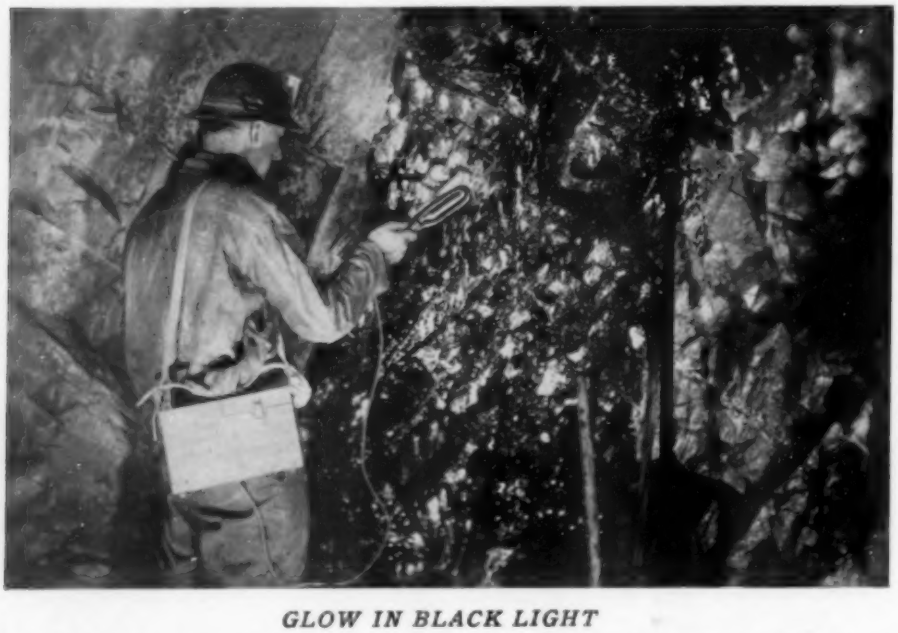
"Modern equipment increases the speed of the reaction but doesn't change the final result. Science further holds this important ace—it has the ability to reduce economic pressure because productivity per man, per acre, per hour, per anything is rapidly increasing, hence in the long run there will be a gradual diminution of economic pressure in certain groups. Since Germany can and is making nitrate fertilizers from the air, artificial rubber from limestone and coke, motor fuels from coal, there is less high pressure demand for these commodities than there would otherwise be. The demands of peoples are gradually being limited to a few basic commodities such as coal, iron, lumber, cotton and potash. It simplifies the picture of international relations and demands and hence raises hopes of peaceful solutions.

"Economic pressure is one, if not almost the sole fundamental cause of war. It is only through the application of science that we can hope to have a universal standard of living high enough to ease this pressure which is the virus of the greatest mental disease of the world."

Dr. Furnas said that science and technology are taking us toward a longer and better life and doing it relatively swiftly. If the world can for a short while keep the superpatriots from cutting the jugular vein of civilization, he believes we shall find applied science leading us into the wide rolling sea of the good life.

"Only the most rabid optimist could say that life is yet 'good' for the average man," he said, "but give us time and it will be. The critics of science are impatient. The scientists are just beginning to get steam up. With the help of the crowd, or perhaps in spite of it, they will soon begin going places."

Science News Letter, March 13, 1937



GLOW IN BLACK LIGHT

Invisible light rays of ultra-violet are used at the Humboldt Mine, Mill City, Nev., to detect patches of scheelite, one of principal sources of tungsten. Frequently scheelite is nearly colorless and looks quite like the quartz with which it is associated. When irradiated with ultra-violet rays, it glows with characteristic fluorescence.

BIOGRAPHY

Gregor Mendel Regarded His Life as a Failure

JOHANN Gregor Mendel, mitred abbot of the Monastery of St. Thomas in Brünn, founder of the modern science of genetics, rated himself as a failure. The "breaks" were against him from early boyhood, nothing that he undertook seemed to prosper, and his greatest apparent success only defeated the end which he hoped it would promote.

This somewhat gray picture of one of the most significant lives in the history of science was presented by Prof. Samuel W. Fernberger of the University of Pennsylvania in a discourse before the Franklin Institute of Philadelphia. That the world now universally acclaims Mendel can not really redress the balance, suggested Prof. Fernberger: "Posthumous praise is poor consolation indeed!"

Mendel's hard luck began with his father's bad judgment. The elder Mendel, an orchardist, had bought himself land-poor, so that when young Johann was sent away to school he had so little to eat, much of the time, that he was often ill. In later adolescence, he tried to work his way through college by tutoring, and didn't have a great deal of success at that.

He finally gave up hopes for a secular career, and presented himself at the Abbey of St. Thomas as a candidate for admission to the Order. Here he had his only two favorable

"breaks": the then ruling abbot was interested in natural science, especially botany, and encouraged the young novice; and after some years a shortage of priests brought about his ordination before his whole course was completed.

But his ill luck caught up with him at once. He was temperamentally unsuited for the pastoral work to which he was assigned. Visiting the sick and dying depressed him to the point of positive physical illness; he had to give it up.

Then his abbot set him to work as a substitute teacher. This work agreed with him. He took the state examinations for certification as a full-fledged high school teacher—and failed ignominiously. His abbot saw to it that he got some university training. He tried again—and again failed. He gave up the effort, and for twenty years continued teaching with only the rank of substitute.

A Buried Revolution

It was during these teaching years that Mendel conducted his numerous scientific activities, including the work on garden peas that now writes his name in the stars of science's sky. But even here misfortune continued to dog him. Nobody paid any attention to his results when they were published, and they remained buried for a generation before their rediscovery and proper appraisal.

The abbacy becoming vacant, Mendel became a candidate, thinking that in this position he would have more time for research. Instead, he had to become a hard-pressed business manager for the monastery property—with a bitter tax fight on his hands to boot.

When he lay dying, in 1884, he wrote his own obituary notice for the press. In it he mentioned that he had been a mitred abbot and that the Emperor had conferred a decoration upon him. But he said nothing whatever about having once planted peas in a garden.

Science News Letter, March 13, 1937

METALLURGY

Aluminum Horseshoes Made for Race Horses

RACE horses in Germany can now wear aluminum shoes which weigh less than three ounces. Made of aluminum specially hardened, they are said to wear almost as well as the ordinary iron kind.

Science News Letter, March 13, 1937

GENERAL SCIENCE

Less Spent on Cancer Study Than on Major Football Game

Danger of Postponing Medical Examination in Suspected Cases Emphasized by Harvard Medical Faculty Member

IF WE as a nation were willing to spend on cancer study what we spend on luxuries, invaluable knowledge could be added to science's meager understanding of this merciless scourge, now the second chief cause of death, Prof. William T. Salter of the Harvard Medical School declared.

Statistics compiled by the International Cancer Research Foundation, he said, indicate that the total sum expended annually for cancer research in America is probably less than that spent on one major football game. Indeed, the budget of a single great American industry for research in new problems last year was about twenty times our national expenditure for cancer research.

Yet every day doctors hear the pathetic query, "Why isn't more known about the cause and prevention of cancer?" And they will keep on hearing that question, he emphasized, until permanent scientific positions and laboratories are established for the careful and prolonged study of malignant growths. We are generous in providing care for hopeless cases, he said, but it is not easy to enlist support for cases yet unborn.

Watch Earliest Symptoms

Like so many other calamities which beset mankind, cancer rarely comes to mind until disaster is imminent. Chief progress during the last decade, he said, has been medicine's effort to correct this fault, to educate the people in the early symptoms of cancer.

"Intelligent people," he said, "now realize that cancer is rarely painful at its inception and that the appearance of a lump or tumor or of an unusual discharge may indicate cancer and must be investigated at once by a competent doctor. Indeed this widespread publicity has raised two secondary problems, the better training of practitioners in the recognition of incipient cancer and the equipping of properly staffed tumor clinics for treatment and for special diagnostic procedures."

There still remains much misapprehension about the disease, he continued, largely due to the failure of people to realize there are many varieties of cancer.

"Some are relatively benign, while others are rapidly fatal," he explained. "One of the great aids in distinguishing between these types is the microscopic examination of a small bit of the tumor removed for classification. Failure to perform this biopsy has led to many mistakes in the past. Patients have mistakenly been told that they had cancer and had little time left to live, while others have been told they had 'nothing serious' when actually a malignant growth was present.

"Patients who refuse to have a specimen removed for examination by a reliable surgeon and studied by a skilled pathologist can scarcely hope for intelligent treatment. Indeed, even when malignant tissue is obviously present, the examination is of value in deciding how dangerous the growth is, and will guide the surgeon in determin-

RADIO

March 16, 5:15 p.m., E.S.T.

OUR PREHISTORIC ANCESTORS—Edgar B. Howard of the Philadelphia Academy of Natural Sciences.

March 23, 5:15 p.m., E.S.T.

LIFE IN THE LATE STONE AGE—Prof. V. Gordon Childe of the University of Edinburgh.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

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ing the type of treatment best suited to the case."

As to the cause of cancer, science still remains in the dark, he said. The best answer is simply that it is unknown, although a next best answer is that it is in some way associated with chronic irritation. A jagged tooth, for example, may produce chronic inflammation and a cancerous ulceration. Pipe irritation may bring cancer of the lip to an inveterate smoker. Perhaps some similar reason explains why sea-faring men and farmers are more prone to develop skin cancers than indoor workers. Likewise, chimney-sweepers used to develop skin-cancers from constant irritation of the skin which may become cancerous.

As to what part inheritance may play in human susceptibility to cancer, science is also pretty much in the dark, Dr. Salter admitted.

"Although it is true that mice can be bred, brother to sister, so that eventually all the animals of that strain die of cancer, human beings are such mongrels (from the mouse's point of view) that there is no very definite inheritable factor so far as individual patients are concerned. Indeed, individuals vary so much one from another, and their tumors vary so remarkably, that scientists are almost completely dependent upon animals for the detailed study of cancer and its peculiarities.

"By inoculating animals (chiefly pedigreed mice and rats) with tumors it is possible to grow many cancers of a single type and thus make many detailed observations on the same kind of tissue. Only by this method can uniformly reliable experimental results be obtained. In this fashion it has been possible to show that cancer tissue is chemically different from other, normal tissues. It has even been found possible to produce artificially an immunity to cancer in laboratory animals under suitable conditions," he declared.

While there is no evidence that human cancer is "contagious," he continued, it has been possible to extract in the laboratory from growths in animals a juice or filterable virus, which produces a similar growth on injection into another animal. Several such extracts are known, each capable of producing a characteristic tumor in the appropriate species of animal. In recent years, he added, chemically pure substances have been made which also produce cancer on injection, but scientists are still trying to decide if there is any relation between these substances and cancer in human beings.

Concerning the "cure" of cancer, Dr. Salter said that many human cases are cured by surgical means or radium or X-ray treatment, with the visible cancers in general being more amenable to treatment. Likewise the less malignant cancers offer more hope of recovery than the more malignant ones.

Science News Letter, March 13, 1937

PALEONTOLOGY

225,000,000-Year-Old Bones Of Texas Reptile at Harvard

A COMPLETE fossil specimen of a long-spined Dimetrodon, one of the earliest of reptiles and apparently the commonest animal on earth about 225 million years ago, has recently been brought to Harvard University by Robert Witter of the Museum of Comparative Zoology.

It was found in the "red beds" of northwestern Texas, which have previously yielded numerous skeletons of the early Permian period, of which the Dimetrodon was characteristic.

Most spectacular feature of the eight-foot animal is a series of long, bony spines extending two feet upward from its back. There is evidence that in life these spines were connected by a web of skin to form a sort of sail.

The function of this sail, if any, is still a scientific puzzle. It was at one time thought to be used in frightening Dimetrodon's adversaries but general agreement that Dimetrodon was pretty much master of the earth in his day dispelled this guess.

The theory has also been advanced that it was used in swimming, either as a rudder or a sail, but the animal was primarily a land-dweller, so this idea has also been abandoned. Even if it had been usable as a sail the animal would probably have been too stupid to get any benefit from it, one scientist has pointed out, for its nearly foot-long skull encased a brain only about the size of a man's little finger.

Science News Letter, March 13, 1937

ON FRIENDLY TERMS

HERPETOLOGY

Snake Accepts Human Aid In Shedding His Skin

See Front Cover

ST. PATRICK himself could not have claimed less concern about serpents than Frank Garvin, S.J., of the Fordham University science faculty. If anything, matters would seem to have improved considerably since the days of Patrician legend; for here neither snake nor man had any fear for the other. The serpent, a big, husky gopher snake, was starting the difficult process of shedding his skin when Mr. Garvin proffered aid. The snake seemed to appreciate this human assistance in moulting, and submitted to handling without a sign of resentment. The discarded skin is shown on the front cover of this week's SCIENCE NEWS LETTER.

Science News Letter, March 13, 1937

The principal city of the Virgin Islands is no longer St. Thomas, but Charlotte Amalie, which is the old Danish name, revived by the people.

PHYSICS

History of Piece of Glass Affects Its Physical Make-Up

Each Event in Its Making Leaves Record in Strength, Elasticity, and Other Properties

JUST AS the character of a man or woman today is determined to a considerable extent by the past history of experience and environment, so too is the character of a piece of glass determined by its past history, it was disclosed at the Corning, N. Y. meetings of the Optical Society of America.

In man the past experience changes one's education, moral training and other attributes. In glass it is such physical properties as density, expansion, elasticity and that all important factor of light bending, known as the index of refraction, which are changed by the past history of a given sample of glass.

Howard R. Lillie of the Corning Glass Works showed the atomic arrangement of glass and tests devised to study changes in glass with changing past heat treatment.

Scientists of the University of Rochester's Institute of Optics, L. C. Martin and Dr. T. R. Wilkins, showed how they obtain three dimensional photographs of tracks in photographic emulsions caused by the passage of some high speed atomic particle like alpha rays.

Highly important in the trick of using such photographic emulsions in the study of cosmic rays and the radiation obtained in atom bombardment experiments, is the knowledge of the exact position of the minute tracks in three dimensions. Stereoscopic viewing and photography made this possible.

Relativity Origins

Time turned back to 1881 in the report of the widely-known Bell Laboratories scientist, Dr. Herbert E. Ives, in his discussion of the famed Michelson-Morley experiment to detect the hypothetical "ether" which was then assumed to carry light through space.

It was the negative result of the Michelson-Morley experiment—the inability to detect the presence of an "ether"—which set up a chain of scientific thinking that resulted, in 1905, in Albert Einstein's special theory of relativity. Since then the notion of an ether carrying light vibrations has fallen into disfavor as a concept of the science of physics.

Dr. Ives tackled the problem of theoretical optics involved in tracing the course of a pulse of light through the instrument—an interferometer — with which the ether conceivably might be detected. Using graphical methods and elaborate drawings beautiful in their curves and symmetry, Dr. Ives was able to explain the known negative results obtained in later variations of the famous experiment by other investigators.

Photocell Sensitivity

The sensitivity of the photoelectric cell—the scientist's electric eye—may be greatly increased by treating its sensitive surface with wet hydrogen, Prof. Jacob Kunz of the University of Illinois reported.

After the surface had been treated with the moist hydrogen the gas was pumped off and while the sensitivity fell quickly from large values it finally remained stationary at the improved factor of five times its former sensitivity.

Science News Letter, March 13, 1937

PHYSIOLOGY

Frightened Cat's Heartbeats Given Electrical Recording

THE HEART beats of a cat upon sudden sight of another cat or a large and active police dog have been captured and made permanent in the form of electrical records by Drs. J. G. Beebe-Center and S. S. Stevens of Harvard University.

The feline heart does tricks under these emotional circumstances that it does not do even when the cat hears a pistol shot. The menacing dog speeds up the cat's heart an average of 81 per cent, and about a second after first sight of this natural enemy a single extremely fast beat occurs, which may be an extra beat. This increase in heart rate is so extremely great that it may be close to the physiological ceiling for the animals, the investigators stated.

After the pistol shot, the heart also speeded up and the increased rate lasted just about as long as that produced by the police dog. But the speeding up was not nearly so intense, and the extra fast beat was not observed.

The heart was not chosen for study in this connection because of any idea that it is the seat of the emotions, but because heart rate is an easily measured body response to emotional situations. The cat served as subject because it is so easy to place her in such a fur-raising, spitting situation.

Science News Letter, March 13, 1937

PHARMACOLOGY

Crystals of Super-Pep Obtained from Capsicum

CRYSTALS that are 200 to 500 times as hot as red pepper have been extracted from capsicum by Prof. Linwood F. Tice of the Philadelphia College of Pharmacy and Science. These crystals are called capsaicin and are the active principle of capsicum. With these crystals of super-pep Prof. Tice has devised a method of assay for capsicum which is being considered for adoption as a standard method in the U.S. Pharmacopoeia.

Science News Letter, March 13, 1937

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HORTICULTURE

NATURE RAMBLINGS
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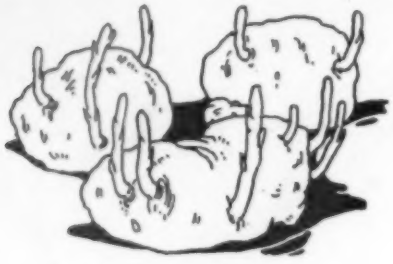

"Spud" Superstitions

POTATOES in your cellar are sprouting amain, as though impatient to be put in the ground to grow. And there are two potato-planting superstitions that you are doubtless hearing from right now.

One is that potatoes should be planted on Saint Patrick's Day. This must be of comparatively recent origin, as folk-ideas go, for the "Irish" potato did not get to Ireland until two or three centuries ago. But once it did, and could establish itself as a thoroughly naturalized Irish citizen, the idea that it should be planted on the festival of the patron saint of Ireland seems to have been irresistible.

The only difficulty, for the northern part of the United States and all of Canada, is that it simply won't work. March 17 is much too early to plant in any soil that has been thoroughly frozen in the winter. It still wants three or four weeks, at the very least, to finish thawing out and to get warmed up. Except in the South, potatoes planted on Saint Patrick's day will simply turn moldy and decay in the ground.

The second superstition is like unto the first, except that it has to do with a movable date. Many people—more perhaps than are devoted to the Saint Patrick's day notion—are firmly convinced that for best growth potatoes must be put into the soil on Good Friday. Possibly there is a vague sort of hook-up with the Bible story of the Resurrection back of it—though the whole thing may even go far back into pagan times, stemming from such symbolic seedtime resurrection-cults as those of Osiris in Egypt and Adonis in Asia Minor.

Whatever its origin, the idea of planting potatoes on Good Friday can claim validity only in years when Easter falls at its "normal" time, about mid-April. This year, with Good Friday falling on March 26, is obviously no time to risk any good seed potatoes in putting it to a large-scale test.

Science News Letter, March 13, 1937

ASTRONOMY

Veteran Princeton Astronomer Has Studied 300,000 Stars

MEASURING changes in the brightness of eclipsing variable stars is the forte of Dr. Raymond S. Dugan, professor of astronomy at Princeton University and president of the Commission on Variable Stars of the International Astronomical Union.

During the past 32 years, over half a million such measurements have been made at the Princeton Observatory, approximately 300,000 of them by Prof. Dugan in person. He is generally regarded as having the most accurate photometric observing eye in the world.

Authoritative light curves of 19 eclipsing variable stars have been published by Prof. Dugan. One of them was based on a series of over 14,000 measurements, and for another he took observations over a period of nine years in order to obtain the necessary data.

The process of making each measurement involves adjusting a photometer so that the eclipsing variable star and another star of constant luminosity appear equally bright. Although a measurement can be made in less than a minute, the exacting nature of the work restricts the number of them which can be made during one observation period, and weather conditions usually permit measurements on only about 100 nights a year.

Eclipsing variables, it was explained by Prof. Dugan, are "double stars" which are so close to each other, astronomically speaking, that they could not be distinguished individually by a telescope a hundred times more powerful than any in existence today. Some of these stars are much bigger and brighter than the sun, but they are so far away from the earth that only a few can be seen with the naked eye.

The stars, many of which are stretched by mutual attraction into a shape resembling a football, eclipse each other once in every revolution, and the measurements are designed to determine the length of the eclipses, which star is the larger and brighter and whether the eclipses are total or partial. Prof. Dugan has observed pairs which eclipse each other six times every day, and one in which the eclipses last about two years and occur at 9,883-day intervals.

Observers in many parts of the world are now investigating this field of astronomy, and Prof. Dugan seeks to keep them acquainted with the latest information and to coordinate their efforts whenever possible. Since he began his work in 1905, the number of definitely known variable stars has increased from 50 to approximately 1,000, and new ones are being discovered at the rate of about 100 each year.

Science News Letter, March 13, 1937

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•First Glances at New Books

Additional Reviews On Page 176

Mathematics—Biography

MEN OF MATHEMATICS—E. T. Bell—*Simon and Schuster,* 592 p., plates, $5. Because much of the language of mathematics is quite foreign to most people, the opportunity to understand the ways and accomplishments of mathematicians is infrequent. Through this enchantingly written biographical history one who does not know a prime number from X can acquire some of the flavor and enthusiasm of those who practice the queen of the sciences. Dr. Bell is a professor at California Institute of Technology; he also writes fiction. The lives and achievements of the great mathematicians from Zeno to Poincaré are included.

Science News Letter, March 13, 1937

Engineering

COAL, ITS CONSTITUTION AND USES—William A. Bone and Godfrey W. Himus—*Longmans,* 631 p., illus., $7.50. Britain's modern greatness was founded largely on coal; the present illness of her collieries gives concern to the whole kingdom. Which makes the present scholarly examination of coal, primarily from the engineering standpoint but involving of necessity economics, geology, and chemistry as well, of particular interest. Large sections of the book are as useful on this side of the Atlantic as they are on the other.

Science News Letter, March 13, 1937

Economics

OIL: STABILIZATION OR CONSERVATION? A CASE STUDY IN THE ORGANIZATION OF INDUSTRIAL CONTROL—Myron W. Watkins—*Harper,* 269 p., charts, $3.50. Oil in America is both a great benefit and a great bane. We would not know what to do without it—and we have not yet learned what to do with it, so far as the problem presented by its technological-economic tangle is concerned. This book stems from a study by the Brookings Institution during NRA days; additional data and new developments bring it down to date.

Science News Letter, March 13, 1937

Herpetology

SNAKES OF MARYLAND—Howard A. Kelly—*Natural History Society of Maryland,* 103 p., illus., 10 col. pl., 60c. This brochure might well serve as a model of how a special fauna for a particular region should be treated. Simple and clear descriptions, accounts of habits, careful citation of records are supplemented with a superabundance of illustrations in both halftone and color. It should be useful for the whole group of states bordering on Maryland.

Science News Letter, March 13, 1937

Motion Pictures

EDUCATIONAL FILM CATALOG, A CLASSIFIED LIST OF 1175 NONTHEATRICAL FILMS WITH A SEPARATE TITLE AND SUBJECT INDEX—Dorothy E. Cook and Eva Cotter Rahbek-Smith, Compilers—*Wilson,* 134 p., $2, Quarterly supplements, $2 per year. An indispensable guide to what nontheatrical films are available and how they may be obtained. This is a major service to those who are using visual educational methods in their work. The list proper is conveniently arranged in the Dewey Decimal Classification.

Science News Letter, March 13, 1937

Geography

MOUNTAIN GEOGRAPHY, A CRITIQUE AND FIELD STUDY—Roderick Peattie—*Harvard,* 257 p., illus., $4. He who runs may not read this book; it is rather for the scholar; but such a one it will reward.

Science News Letter, March 13, 1937

Calendar

THE ROMANCE OF THE CALENDAR—P. W. Wilson—*Norton,* 351 p., $3. Whether the calendar ever gets reformed again or not, we shall still take much interest in any system of telling the days of the month, for they bring occasions we are all greatly interested in: birthdays, holidays, paydays. This perennial interest in calendar subjects should insure the success of this book, which traces the history of calendars and calendar-makers, and in the last section takes us for a look into the future. It is briskly and popularly written, but by no means a superficial book for a' that.

Science News Letter, March 13, 1937

Home Economics

MODERNISTIC FLOWER ARRANGING—Barbara Sagel Meisse—*Orange Judd,* 160 p., plates, $2. New ideas in table and house decoration with flowers, well discussed, and illustrated with halftone plates of most exceptional photographic technique.

Science News Letter, March 13, 1937

Botany

FIRST BOOK OF GRASSES: THE STRUCTURE OF GRASSES EXPLAINED FOR BEGINNERS (Rev. Ed.)—Agnes Chase—*W. A. Silvens,* 125 p., illus., $1.25. Students (and independently working botanists) who think that grasses are "hard" should be given this little book. Its simple, clear, step-by-step presentation, backed by illustrations that bring out critical features unmistakably, will make an enthusiastic agrostologist out of anyone who is interested at all in outdoor things.

Science News Letter, March 13, 1937

Economics

ANNUAL REPORT OF THE TENNESSEE VALLEY AUTHORITY FOR THE FISCAL YEAR ENDED JUNE 30, 1936—*Govt. Print. Off.,* 377 p., 55c.

Science News Letter, March 13, 1937

Physics

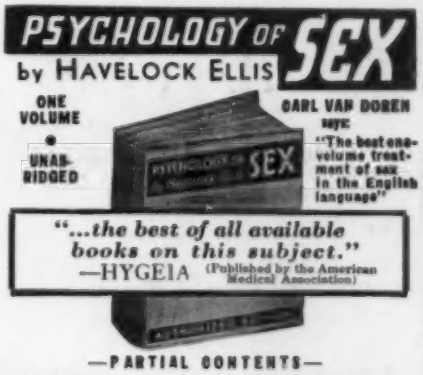
AN INTRODUCTION TO THE THEORY OF ELASTICITY—R. V. Southwell—*Oxford University,* 509 p., $10. Voluminous British text which covers the ground needed for an honors course in the strength of materials. Stress is laid on the physical principles which underlie the theory of elasticity and the mathematical treatment of the subject is broadly and thoroughly covered.

Science News Letter, March 13, 1937

Zoology

HISTOIRE NATURELLE DE LA CONNAISSANCE CHEZ LE SINGE INFÉRIEUR; NO. II: LE SYNCRÉTIQUE, 58 p., illus., 12 fr; No. III: L'ABSTRAIT, 54 p., illus., 12 fr.—*Hermann & Cie, Paris.*

Science News Letter, March 13, 1937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Additional Reviews On Page 175

Conservation

SOIL EROSION AND ITS CONTROL—Quincy Claude Ayres—*McGraw-Hill,* 365 p., illus., $3.50. A thorough, scholarly yet highly readable book on the most important single physical fact confronting the people of this country today; on the mastering of which, indeed, our very national existence depends. Prof. Ayres begins with the phenomena of soil erosion and its causal factors, outlines methods of control and tells their cost, discusses special machinery from a very practical viewpoint, and concludes with a stimulating chapter on soil conservation and land use.

Science News Letter, March 13, 1937

Conservation

STATE PLANNING PROGRAMS AND ACCOMPLISHMENTS — National Resources Committee—*Govt. Print. Off.,* 128 p., 25c. A state-by-state summary of what has been attempted, what done, and what yet to be done in such important fields as water use, housing, parks, soil and mineral resources, in all the federated commonwealths.

Science News Letter, March 13, 1937

Marine Biology

ANIMALS OF THE SEASHORE—Muriel Lewin Guberlet—*Metropolitan,* 412 p., illus., $2.50. A pocket-sized book, devoted primarily to the seashore fauna of the Pacific Northwest coast, each page giving a description of an animal and faced with a halftone illustration. Most of these pictures are excellent, especially when the difficulty of their subjects is considered. This book should be highly valuable for schools and equally useful to the solitary naturalist.

Science News Letter, March 13, 1937

Medicine

SKIN DISEASES IN CHILDREN—George M. McKee and Anthony C. Cipollaro—*Hoeber,* 345 p., illus., $5.50. A book for physicians, written by a professor and an associate in dermatology and syphiology at the New York Post-Graduate Medical School, Columbia University.

Science News Letter, March 13, 1937

Medicine—Biography

LIFE AND CONVICTIONS OF WILLIAM SYDNEY THAYER, PHYSICIAN — Edith Gittings Reid—*Oxford,* 243 p., $2.50. Dr. Thayer, a successor of Sir William Osler as Professor of Medicine at Johns Hopkins, was internationally known. An account of his experiences abroad during the World War forms an exciting section of the book.

Science News Letter, March 13, 1937

Medical Care—Economics

SICKNESS AND INSURANCE, A STUDY OF THE SICKNESS PROBLEM AND HEALTH INSURANCE — Harry Alvin Millis—*Univ. of Chicago,* 166 p., $2. Written by the Professor of Economics at the University of Chicago.

Science News Letter, March 13, 1937

Ornithology

JACK MINER AND THE BIRDS AND SOME THINGS I KNOW ABOUT NATURE (4th printing)—Jack Miner—*Reilly & Lee,* 207 p., illus., $1. A new printing of a book about wildlife and its conservation, by a natural-born woodsman who has earned his right to say his say by many years of patient study, and by operating a successful private game sanctuary of his own.

Science News Letter, March 13, 1937

Entomology

STRANGE INSECTS AND THEIR STORIES—A. Hyatt Verrill—*Page,* 205 p., illus., $2.50. This book aims at instructing through entertaining, and even through startling; but the quality of the facts imparted does not suffer thereby. By such books as this first interest is aroused, that in some readers at least grows into systematic study.

Science News Letter, March 13, 1937

Historical Geography

AN ATLAS OF EMPIRE—J. F. Horrabin—*Knopf,* 141, iii p., maps., $1.50. Terse comment accompanying uncluttered outline maps, telling of the spread of the domination of European nations (including Europeanized Japan) at the expense of less aggressive peoples and over thinly occupied regions. The author takes no sides, does not philosophize, just tells the story as objectively as he can.

Science News Letter, March 13, 1937

Television

TELEVISION; TECHNICAL TERMS AND DEFINITIONS—E. J. G. Lewis—*Pitman,* 95 p., $1.75. Glossary of terms which have come into being with the advance of television.

Science News Letter, March 13, 1937

Autobiography

RECOLLECTIONS AND REFLECTIONS—Sir J. J. Thomson—*Macmillan,* 451 p., $4. The discoverer of the electron and one of the great figures in contemporary physics tells the story of his life and the many developments that centered around Trinity College and Cambridge. Important to historians of science, it is also a human document. The chapter on psychical research, telepathy and water-dowsing will arouse interest; he considers experiments on the dowsing power well worth making.

Science News Letter, March 13, 1937

Photography

PICTURING MIRACLES OF PLANT AND ANIMAL LIFE—Arthur C. Pillsbury—*Lippincott,* 236 p., illus., $3. Anyone who has ever seen one of Mr. Pillsbury's films will own that the title of his book is well justified: the daily events of nature do have a miraculous look as he brings them out with his ingenious time-lapse photographic apparatus. Mr. Pillsbury's modesty might decry the feeling that most beholders have, that there is somewhat of the miraculous about his own contribution to the net result. To this book, telling how he does it, he contributes lavishly in illustrations, both sequences and stills.

Science News Letter, March 13, 1937

Anthropology

THE MANDIBLES OF SINANTHROPUS PEKINENSIS: A COMPARATIVE STUDY—Franz Weidenreich—*Geological Survey of China,* 132 p., 15 plates and 100 text-figures. Available through *A. G. Seiler & Co., 1224 Amsterdam Ave., New York City,* or *G. E. Stechert & Co., 31-33 E. 10th St., New York City.* See page 164.

Science News Letter, March 13, 1937

Physics

IONS IN SOLUTION—R. W. Gurney—*Cambridge (Macmillan),* 260 p., $3. Book which is intended primarily for research physicists and chemists in the field of electrochemistry.

Science News Letter, March 13, 1937

Electrical Engineering

A CLASS BOOK OF MAGNETISM AND ELECTRICITY—H. E. Hadley — *Macmillan,* 512 p., $2.50. British text for courses corresponding to junior college work in this country.

Science News Letter, March 13, 1937